SAFER CONSUMER PRODUCTS

Public Workshop

on DTSC's Proposal to List Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) in Carpets and Rugs as a Priority Product

March 20, 2018 • Facilitator: Asha Setty, Public Participation Specialist

California Environmental Protection Agency

Department of Toxic Substances Control

SAFER
CONSUMER
PRODUCTS

Webcast attendees, submit your comments to:

SaferConsumerProducts@dtsc.ca.gov

DTSC's Proposal to List PFASs in Carpets and Rugs as a Priority Product

Simona Balan, Senior Environmental Scientist Simona.Balan@dtsc.ca.gov

California Environmental Protection Agency

Department of Toxic Substances Control

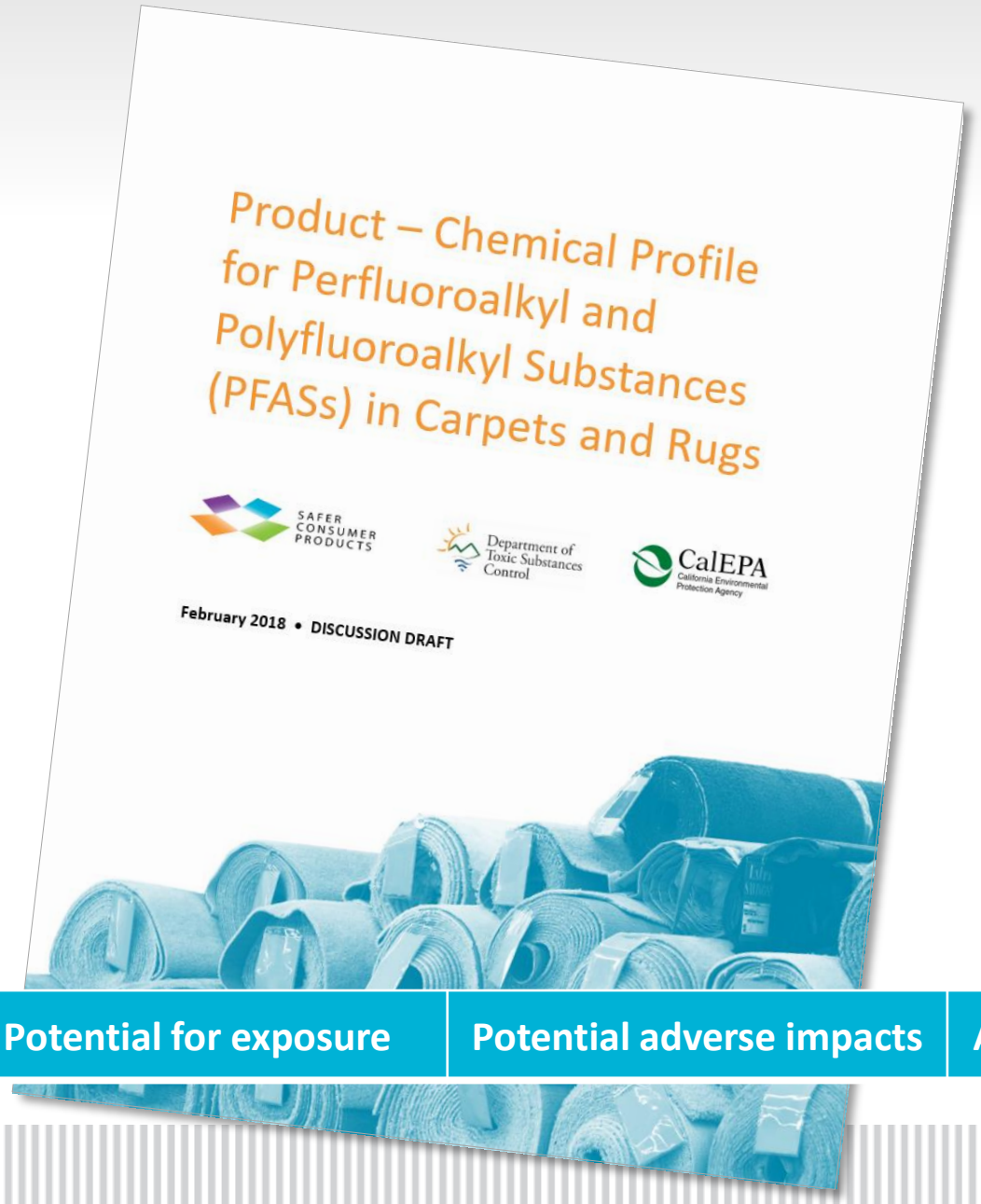
A Priority Product is a product-chemical combination that meets these criteria:

- There are potential **exposures** to a Candidate Chemical in the product

AND

- One or more exposures have the potential to contribute to or cause **significant or widespread adverse impacts**

The technical basis for this proposal



Definitions and scope	Potential for exposure	Potential adverse impacts	Additional considerations

Scope of product: Carpets and rugs

Products made from natural or synthetic fabric intended to be used as a floor covering inside commercial or residential buildings (including carpeted door mats).

- GPC[1] Brick Codes:
  - Carpets: 10002446
  - Rugs: 10002218
- NAICS[2] Codes:
  - 314110 (carpet & rug mills)
  - 325220 (carpet fibers)

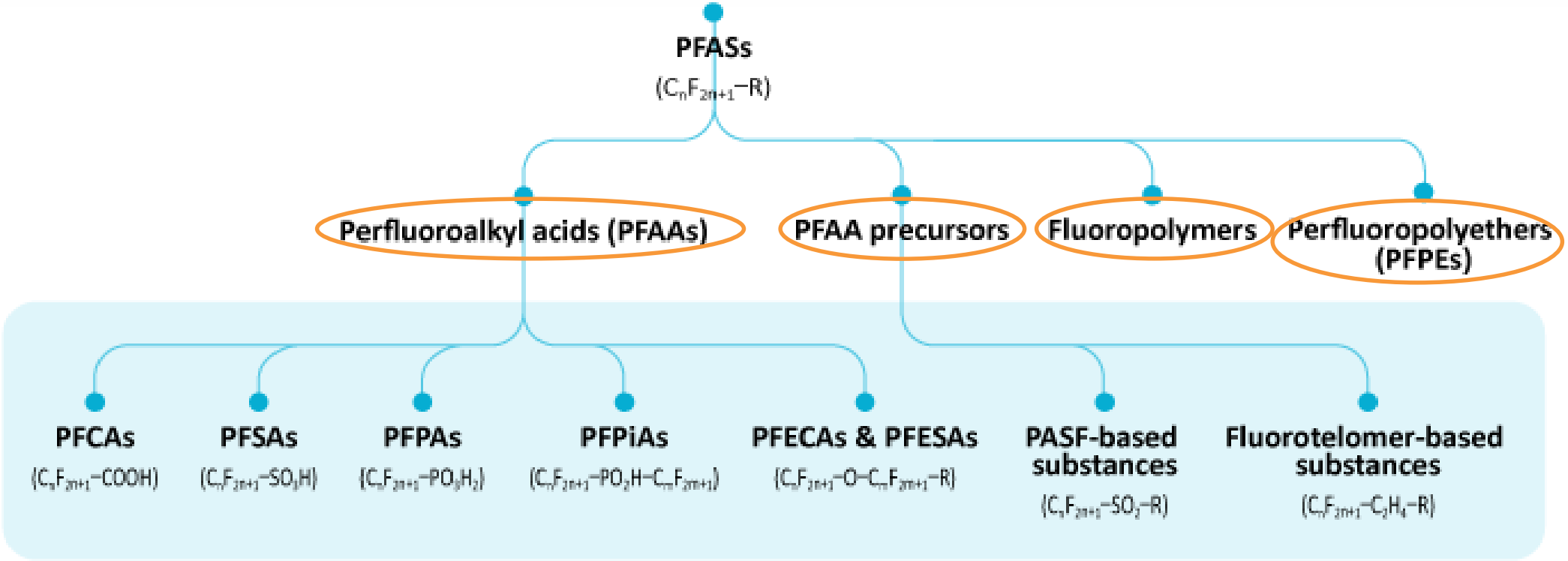
[1] Global Product Classification

[2] North American Industry Classification System

Scope of Candidate Chemical: Perfluoroalkyl and polyfluoroalkyl substances (PFASs)

- PFASs are a class of >3000 man-made chemicals with at least one fully fluorinated carbon atom.
- All are Candidate Chemicals for the SCP program, due to listing by Biomonitoring California as Priority Chemicals.
- PFASs are used in carpets and rugs to impart stain- and soil-resistance.

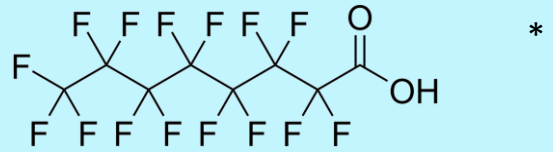
Four main PFAS categories



Wang et al. (2017)

Perfluoroalkyl acids (PFAAs)

Characteristics	Perfluorinated (no C-H bonds); non-polymeric
Key concerns	Extreme environmental persistence; Bioaccumulation (especially the longer-chains); Environmental mobility (especially the shorter-chains); Toxicity documented in humans and animals.
Relevance to carpets and rugs	Not used intentionally. Manufacturing impurities and degradation products of PFAS treatments in carpets and rugs.
Examples	Perfluoroalkyl carboxylic acids Perfluoroalkyl sulfonic acids Perfluoroether carboxylic acids Perfluoroether sulfonic acids

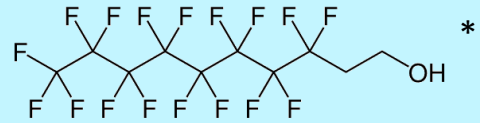


PFOA *

*Image Source: Wikipedia

PFAA precursors

Characteristics	Mostly polyfluorinated (some C-H bonds); Some non-polymeric, some polymers.
Key concerns	All degrade to PFAAs. Some are also environmentally persistent. Some are mobile in the environment. Some are more acutely toxic than PFAAs.
Relevance to carpets and rugs	Side-chain fluorinated polymers are commonly used in carpets and rugs. Non-polymeric PFAA precursors can be manufacturing impurities or intermediate degradation products.
Examples	Fluorotelomer alcohols, aldehydes, carboxylates, etc. Polyfluoroalkyl phosphate esters Side-chain fluorinated polymers

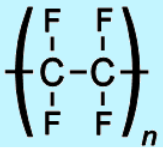


8:2 FTOH

*Image Source: Wikipedia

Perfluoropolyethers (PFPEs) and fluoropolymers

Characteristics	True polymers, do not degrade.
Key concerns	Manufactured using PFAAs
Relevance to carpets and rugs	PFASs suitable for carpet treatments include *"fluoropolymers, perfluoropolyethers (PFPEs), ..."* (Iverson et al. 2017)
Examples	Polytetrafluoroethylene (PTFE) Polyvinylidene fluoride (PVDF)



PTFE *

*Image Source: Wikipedia

Market presence of the product

- Carpets and rugs make up more than half of the U.S. flooring market (54% by revenue and 59% by volume in 2016).
- "*Most residential and commercial carpets are treated*" with PFASs. (Yarbrough 2017)

Monitoring data

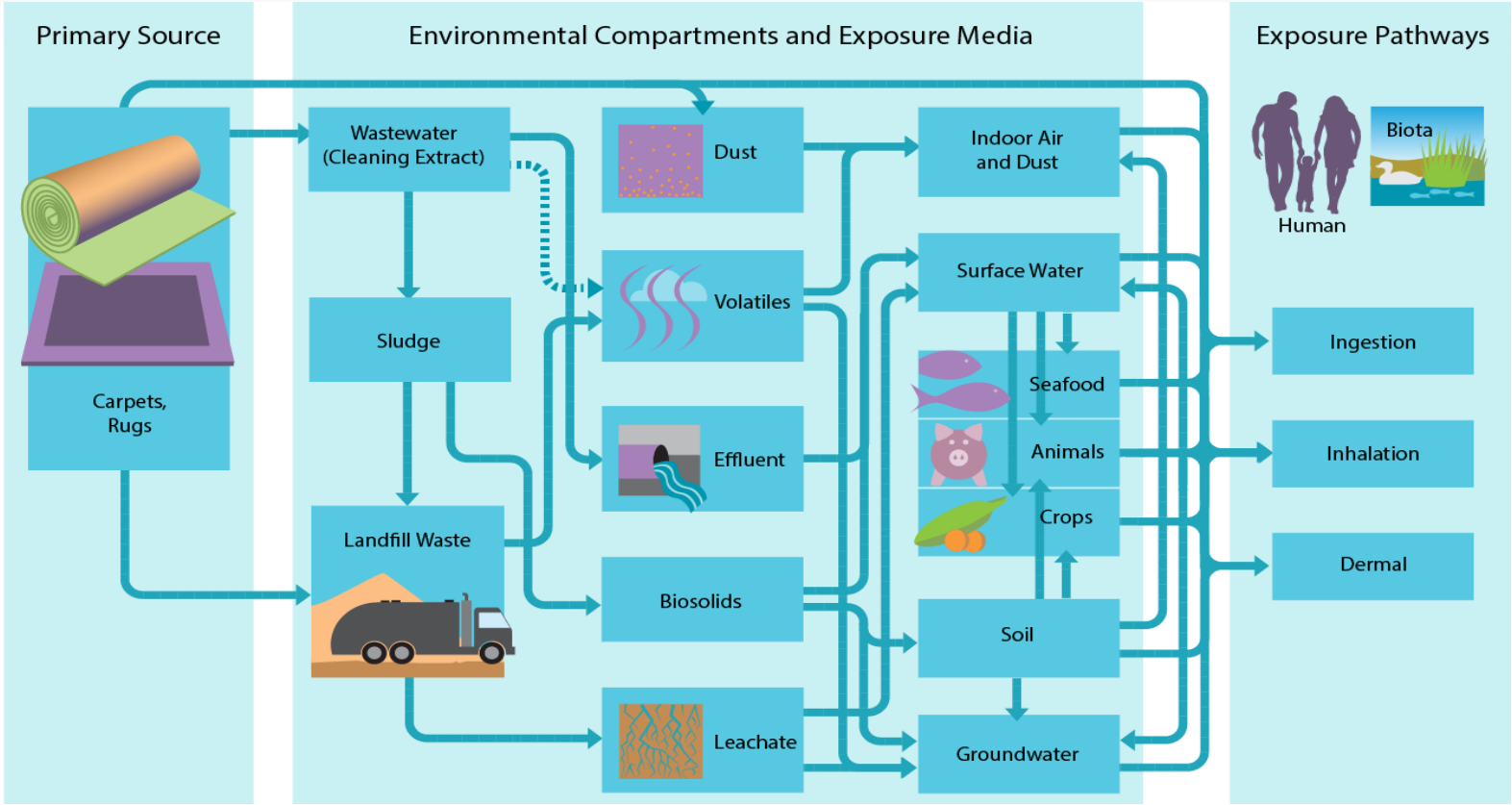
PFASs are ubiquitous in:

- the environment
- plants, animals, and humans
- human food and drinking water

Certain PFAS properties

- Persistence
- Bioaccumulation
- Lactational/ transplacental transfer

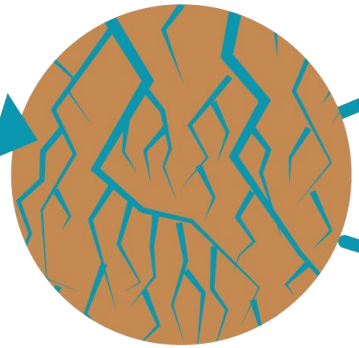
Conceptual exposure model



Potential adverse impacts to waste management and at product end-of-life

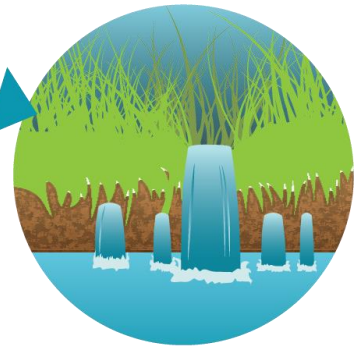
RAINFALL

CARPET WASTE IN LANDFILL



LEACHATE

WASTEWATER TREATMENT PLANT



SURFACE WATER OR GROUNDWATER

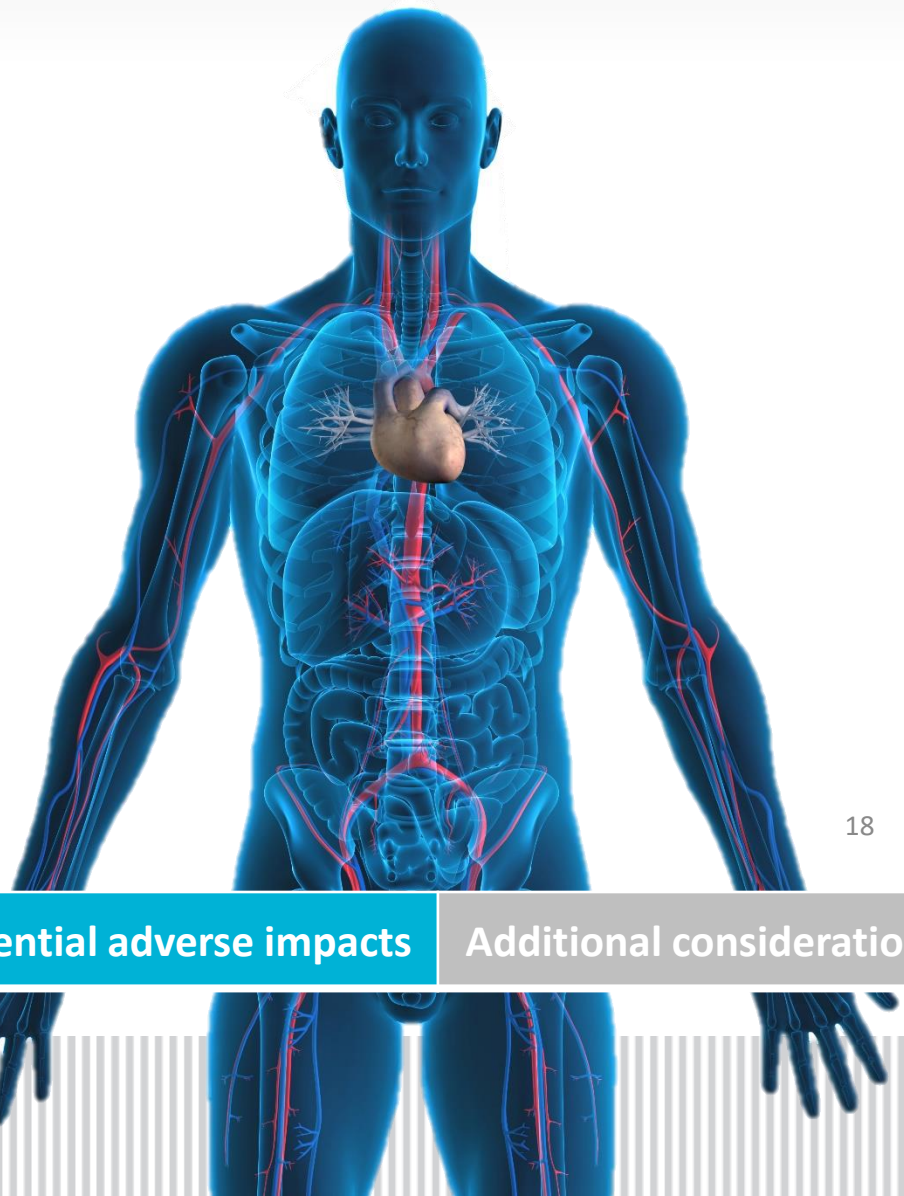
In California, 75% (257 million pounds) of the carpet discarded in 2016 was landfilled

Potential significant and widespread adverse impacts due to PFAS hazard traits

- Exposure potential hazard traits:
  - Environmental persistence
  - Mobility in the environment
  - Bioaccumulation
  - Lactational and transplacental transfer
  - Global warming potential
- Environmental hazard traits:
  - Phytotoxicity
  - Terrestrial ecotoxicity and aquatic toxicity

Potential significant and widespread adverse impacts due to PFAS hazard traits

- Adverse human health effects:
  - Kidney and testicular cancer
  - Increased serum cholesterol
  - Thyroid disease
  - Immune dysregulation
  - Pregnancy-induced hypertension
- PFASs accumulate in human lungs, kidneys, liver, brain, bone tissue, etc.



Potential significant and widespread adverse impacts due to PFAS hazard traits

Other toxicological hazard traits:

- Carcinogenicity
- Developmental toxicity
- Reproductive toxicity
- Cardiovascular toxicity
- Endocrine toxicity
- Hematotoxicity
- Hepatotoxicity and digestive system toxicity
- Immunotoxicity
- Nephrotoxicity and other urinary system toxicity
- Neurodevelopmental toxicity
- Respiratory toxicity

Potential adverse impacts to sensitive subpopulations, endangered species, and sensitive habitats

The most vulnerable human subpopulations include:

- Fetuses, infants, children, pregnant women
- Carpet installers, cleaners, and retail sector workers
- People with certain preexisting conditions

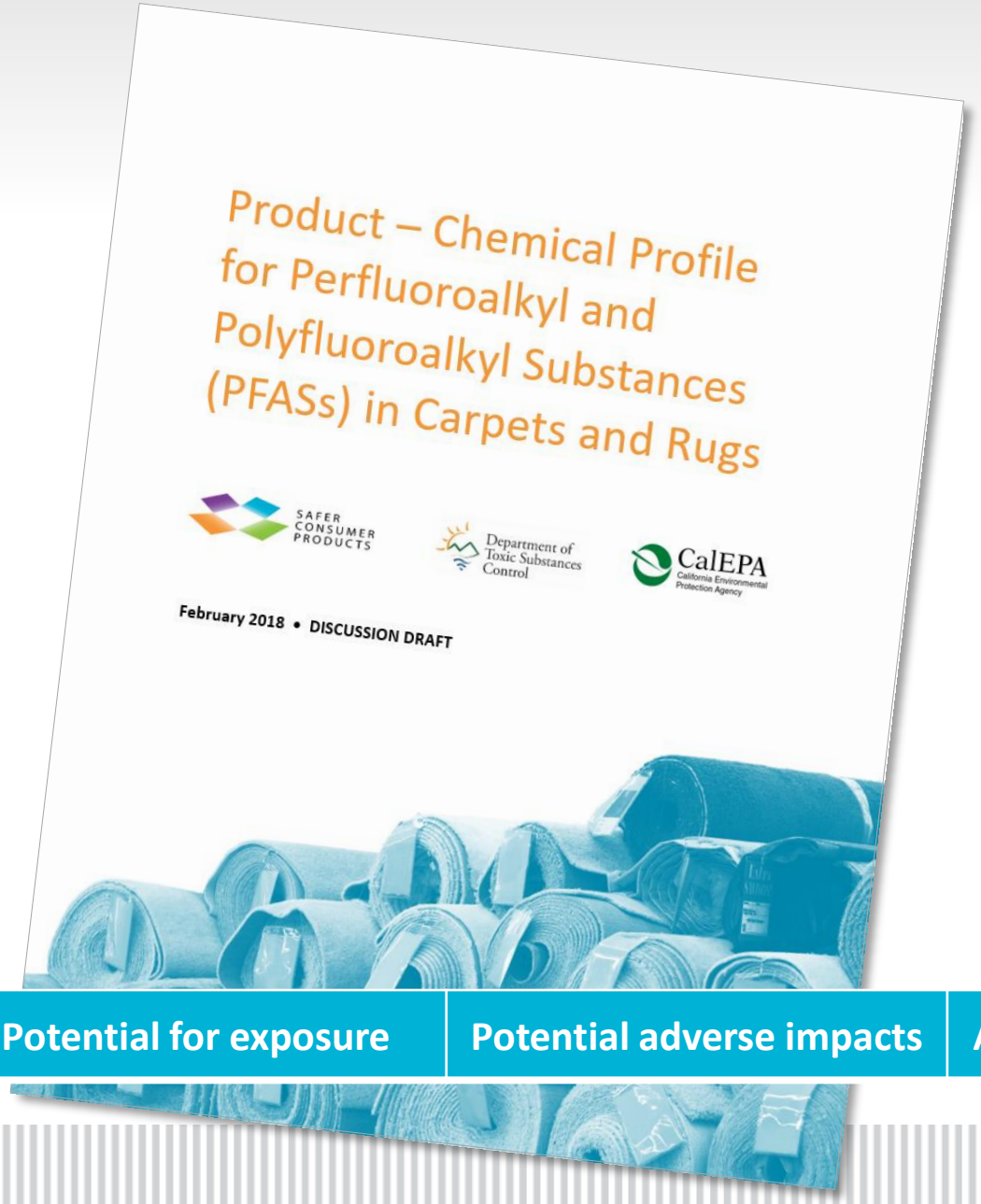
Data gaps

- Publicly-available data limited to PFAAs and some precursors
- Physicochemical properties limited to model results
- Unclear mechanism of toxic action
- Unclear relationship between PFAS environmental presence, levels in biota and humans, and adverse health impacts
- Unknown effects of exposure to PFAS mixtures

Alternatives already available for most uses

- Inherently stain-resistant fibers such as:
  - Wool
  - Polypropylene
  - Polyethylene terephthalate (PET)
  - Polytrimethylene terephthalate (PTT)
  - etc.
- Chemical alternatives such as:
  - Sulfonation
  - Nanoparticle silicate clay-based repellent (Invista 2017)
  - Non-fluorinated Duratech®
  - Eco-Ensure
  - Siloxane and silicone polymers
  - Hydrocarbons
  - Polyurethanes
  - Dendrimers

Submit your comments on CalSAFER.dtsc.ca.gov by April 16, 2018



Definitions and scope	Potential for exposure	Potential adverse impacts	Additional considerations

Contact information

- Follow updates in our E-list: http://bit.ly/scpupdates
- General questions: SaferConsumerProducts@dtsc.ca.gov
- Media inquiries: Barbara.Zumwalt@dtsc.ca.gov
- Technical questions: Andre.Algazi@dtsc.ca.gov and Simona.Balan@dtsc.ca.gov
- Meeting requests: Heather.Kessler@dtsc.ca.gov

SAFER
CONSUMER
PRODUCTS

Webcast attendees, submit your comments to:

SaferConsumerProducts@dtsc.ca.gov

Questions: Product and chemical description

1. Is the product definition clear and unambiguous as to which related products are included or excluded?
2. Are the GPC GS1 and NAICS codes relevant and comprehensive?
3. Is the definition of the class of PFASs clear and accurate?

Questions: Potential exposures and impacts

1. Do you have more specific data on the market presence of the product and its supply chain?
2. What is the release/loss/degradation rate of the PFAS-based treatment of carpets and rugs?
3. What is the scientific basis for claims that lower toxicity is indicated by lower apparent bioaccumulation, persistence, or long-term body burden?

Questions: Potential exposures and impacts

4. What additional research is industry doing to address global concerns on the persistence of PFASs in the environment, and potential human and ecological health impacts?
5. What methods are used for handling and disposing of PFAS waste and PFAS-containing carpet and rug pre- and post-consumer waste?

Questions: Alternatives

1. Do you have further information on the alternatives listed in Ch. 7 of this Product-Chemical Profile?
2. Are there other functionally acceptable alternatives to the use of PFASs in carpets and rugs? If so,
   a. are they commercially available?
   b. do they require the use of a replacement chemical?
   c. are there known hazards associated with these alternatives?
   d. are any potential replacement chemicals listed as Candidate Chemicals?

ON BREAK - Public Workshop

on DTSC's Proposal to List Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) in Carpets and Rugs as a Priority Product

March 20, 2018 • Facilitator: Asha Setty, Public Participation Specialist

California Environmental Protection Agency

Department of Toxic Substances Control

SAFER
CONSUMER
PRODUCTS

Webcast attendees, submit your comments to:

SaferConsumerProducts@dtsc.ca.gov